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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/062,131	02/01/2002	John C. Russell	6885.US.O1	2508

  

23492	7590	11/07/2007
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EXAMINER
HAQ, SHAFIQU

  

ART UNIT	PAPER NUMBER
1641	

  

NOTIFICATION DATE	DELIVERY MODE
11/07/2007	ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

Cassie.Gray@abbott.com  
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**Office Action Summary**

Application No.

10/062,131

Applicant(s)

RUSSELL, JOHN C.

Examiner

Shafiqul Haq

Art Unit

1641

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 09 August 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1 and 30 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1 and 30 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

### DETAILED ACTION

1. Claims 1 and 30 are pending in the application.

#### ***Claim Rejections - 35 USC § 103***

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1 and 30 are again rejected under 35 U.S.C. 103(a) as being unpatentable over Schwartz {US 2003/0013857}.

Schwartz describes a method of attaching a protein to a functionalized solid surface through a hydrazone linkage to form a solid surface-protein complex as described in steps a) through c) of claims 1 and 30 of this application wherein hydrazide-containing macromolecules (e.g. proteins) are immobilized to a functionalized solid support via hydrazone bond formation. Schwartz discloses solid support modified with hydrazide linkers (see paragraphs [0018], [0112], 0134-0135], [0146-0147] and [0150]) which, when reacted with molecules (e.g. proteins, peptides, polynucleotides) possessing carbonyl group forms hydrozone linked molecules (see paragraphs [0144], [0147], [0148] and [0175]) that are cleavable (paragraph [0110]) i.e. molecules (i.e. proteins, peptides, polynucleotides) linked to a solid support with a cleavable linkages (e.g. hydrazone) are disclosed by Schwartz.

Schwartz further discloses that cleavable linkages have been used to isolate receptors (i.e. second macromolecule) following covalent linking between a ligand (i.e. first macromolecule) and a receptor (paragraphs [0109] and [0110]). Schwartz also discloses binding of antibody (i.e. first macromolecule) to hydrazide modified surface using carbohydrate domain of the antibody (that is not involved in antigen binding) to form a hydrazone or oxyamino bond and thus keeping the antibody active site available for binding with antigen (second macromolecule) (paragraph [0180]).

The Schwartz method does not specifically describe a step corresponding to step d) of claims 1 and 30 of this application wherein the protein ('First Macromolecule') is covalently linked to another protein ('Second Macromolecule") and cleaving the first macromolecules from the surface without cleaving the covalent bond between the first macromolecules and the at least one second macromolecule.

Given the fact the biomolecules (binding partners e.g. antibody, receptors) can be linked to solid support through acid cleavable hydrazone linkages (e.g. hydrazone bond) (Schwartz et al.) and given the generic discussion that other conventional methods are known for covalently linking biomolecules to one another (e.g. binding partners) as in the example of Schwartz wherein biomolecules linked to solid support can be linked to other proteins or analytes (e.g. antigen) by conventional methods (i.e. different covalent bonding), it would be obvious to one of ordinary skill in the art at the time the invention was made to use the hydrazine modified support of Schwartz to immobilize a binding partner (e.g. antibody or ligand i.e. first macromolecule) through a cleavable linkage (e.g. hydrazone) to capture

complementary binding partner (e.g. antigen or receptor i.e. second macromolecule) for subsequent cleavage of the binding complex from the solid surface for purification or for further analysis.

The limitation of claim 30 of this application, i.e. the "First Molecule having a molecular weight of at least 2,000 daltons", relates to a molecular weight range conventionally associated with antibodies (a class of proteins).

#### ***Response to Argument***

4. Applicant's arguments filed August 09, 2007 regarding the Schwartz patent have been fully considered but they are not persuasive to overcome the rejection under 35 USC 103. However, previous rejections over Schwartz have been modified in order to cover Applicants amendments. Applicant argued that in present application the linker between the first macromolecule and the solid support is cleavable while the linker between the first macromolecule and the at least second macromolecule is not cleavable and none of the conjugates described in Schwartz correspond to the conjugates or present invention and Schwartz teaches away from the method described herein because Schwartz calls for the cleavage of the first macromolecules (protein) from the second macromolecule (protein), which would destroy the conjugate. Applicants further argued that both a cleavable linker and a non-cleavable linker are required in the method described herein, and Schwartz fails to disclose or suggest the use of a non-cleavable linker.

The above arguments are not found convincing because Schwartz discloses solid support modified with hydrazide linkers (see paragraphs [0018], [0112], [0134-0135], [0146-0147] and [0150]) which, when reacted with molecules (e.g. proteins, peptides, polynucleotides) possessing carbonyl group forms hydrozone linked molecules (see paragraphs [0144], [0147], [0148] and [0175]) that are cleavable (paragraph [0110]) i.e. molecules (i.e. proteins, peptides, polynucleotides) linked to a solid support with a cleavable linkages (e.g. hydrazone) are disclosed by Schwartz. Schwartz further discloses that cleavable linkages have been used to isolate receptors following covalent linking between a ligand and a receptor (paragraphs [0109] and [0110]). Schwartz also discloses binding of antibody to hydrazide modified surface using carbohydrate domain of the antibody (that is not involved in antigen binding) to form a hydrazone or oxyamino bond and thus keeping the antibody active site available for binding with antigen (paragraph [0180]).

Therefore, given the fact the biomolecules can be linked to solid support through acid cleavable hydrazone linkages (e.g. hydrazone bond) (Schwartz et al.) and given the generic discussion that other conventional methods are known for covalently linking biomolecules to one another as in the example of Schwartz wherein biomolecules linked to solid support can be linked to other proteins or analytes (e.g. antigen) by conventional methods, it would be obvious to one of ordinary skill in the art at the time the invention was made to use the hydrazine modified support of Schwartz to immobilize a binding partner (e.g. antibody or receptor) through a cleavable linkage (e.g. hydrazone) to capture complementary binding partner (e.g.

antigen or ligand) for subsequent cleavage of the binding complex from the solid surface for purification or for further analysis. It is the examiner's position that given the Schwartz discussion of the applicability of the cleavable hydrazone bond technology to the conjugation of a wide variety of reactants such as solid surfaces and biomolecules as discussed above, the sequential attachment of a "Second Macromolecule" to a surface-immobilized "First Macromolecule", as claimed, would constitute a routine variation in the sequence of performance of a known set of steps conventionally used to attach biomolecules to each other and/or to solid surfaces via acid cleavable hydrazone bonds as described by Schwartz.

### ***Conclusion***

5. Applicants' amendment necessitated new ground(s) of rejection presented in this office action. Accordingly, **THIS ACTION IS MADE FINAL**. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

If Applicants should amend the claims, a complete and responsive reply will clearly identify where support can be found in the disclosure for each amendment. Applicant should point to the page and line numbers of the application corresponding to each amendment, and provide any statements that might help to identify support for the claimed invention (e.g., if the amendment is not supported *in ipso verbis*, clarification on the record may be helpful). Should Applicants present new claims, Applicants should clearly identify where support can be found in the disclosure.

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Shafiqul Haq whose telephone number is 571-272-6103. The examiner can normally be reached on 7:30AM-4:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Long V. Le can be reached on 571-272-0823. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Art Unit: 1641

A handwritten signature in black ink, appearing to read 'Shafiqueul Haq', with a stylized flourish at the end.

SHAFIQUEUL HAQ  
EXAMINER  
ART UNIT 1641

A handwritten signature in black ink, appearing to read 'Long V. Le', with a stylized flourish at the end.

LONG V. LE  
SUPERVISORY PATENT EXAMINER  
ART UNIT 1641